

**BACKGROUND INFORMATION DISTRIBUTED TO THE NEWS MEDIA BY  
THE OFFICE OF THE CITY ATTORNEY**

**SEPTEMBER 21, 2007**

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**1. 9/20/07-Memo from Tom Zeleny, Deputy City  
Attorney to Richard Haas, Deputy Chief of Public  
Works regarding: Declaration of Water Shortage  
Emergency**

**Office of  
The City Attorney  
City of San Diego**

**MEMORANDUM**

**533-5800**

**DATE:** September 20, 2007

**TO:** Richard Haas, Deputy Chief of Public Works

**FROM:** Tom Zeleny, Deputy City Attorney

**SUBJECT:** Declaration of Water Shortage Emergency

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Per your request, this memorandum outlines the procedural steps necessary for the City to declare a water shortage emergency and implement "Stage 1" water conservation measures. Stage 1 conservation measures are the lowest, or least severe, of four stages. Stage 1 is triggered "when the *possibility* exists that the City of San Diego Water Department will not be able to meet all of the water demands of its customers." SDMC § 67.3806(b) (emphasis added). Stage 1 calls for voluntary compliance with the conservation measures set forth under Stage 2.

The City must hold a public hearing prior to declaring a water shortage emergency, unless there is an event damaging the water system that creates an immediate emergency. Water Code § 351; SDMC § 67.3804(b); City Attorney MOL dated August 14, 1979. Notice of the time and place of the hearing must be published in the City's official newspaper at least seven days prior to the hearing. Water Code § 352. Implementation of conservation measures beyond Stage 1 also requires public announcement and publication in the City's official newspaper for three consecutive days after adoption. SDMC § 67.3807.

There is a sufficient basis to declare a water shortage emergency and implement Stage 1 conservation measures. A water shortage emergency may be declared for threatened shortages that have yet to occur. *San Diego County Water Authority v. Metropolitan Water District of Southern California*, 117 Cal. App. 4th 13 (2004). Judge Wanger's ruling in *Natural Resources Defense Council v. Kempthorne* severely restricts the operation of pumps that send water from the State Water Project to Southern California, upon which San Diego County relies on for about a third of its water. Though Judge Wanger's ruling regarding the Delta Smelt and the State Water Project may not yet be final or implemented, the threat his ruling poses to the City's water supply is enough to declare a water shortage emergency. The City's 2005 Urban Water Management Plan suggests a threshold of a 5% water supply shortage for Stage 1 conservation measures; a threshold we understand will likely be met.

The declaration of a water shortage emergency may be done by resolution, as has been done in the past. See Resolution No. R-276361. The resolution is subject to the Mayor's veto power.

**2. 9/13/07-Media Alert from the Long Beach Water  
department regarding: Water Supply Shortage  
Imminent**



## LONG BEACH WATER DEPARTMENT

The Standard in Water Conservation &  
Environmental Stewardship

# MEDIA ALERT

**FOR IMMEDIATE RELEASE**

**Thursday, September 13, 2007**

Contact: Ryan J. Alsop  
[Ryan\\_Alsop@lbwater.org](mailto:Ryan_Alsop@lbwater.org)  
(562) 570-2314

## Water Supply Shortage Imminent

LONG BEACH, CA – The Long Beach Board of Water Commissioners today officially declared that a water supply shortage for the City of Long Beach is imminent, at a meeting held at the Long Beach Water Department's Groundwater Treatment Facility. In making the Declaration, the Board of Water Commissioners has activated the Long Beach Water Department's Emergency Water Supply Shortage Plan, implementing additional water use prohibitions throughout the City of Long Beach. The Declaration is a proactive measure taken to forestall or lessen the impact of an expected water supply shortage.

Residents and business, citywide, are strongly urged to immediately implement three specific water conservation measures:

1. Immediately eliminate landscapes over-watering and all water run-off;
2. Reduce time in the shower and install low-flow shower heads; and
3. Check your water meter for potential leaks at your home or business

Under the Declaration of Imminent Water Supply Shortage, the following uses of water are now prohibited, citywide:

Washing driveways, sidewalks, parking areas, patios or other outdoor cemented or paved areas with a garden hose, unless it is attached to pressurized water broom;

Irrigating any landscape with potable water between 7:00 a.m. and 6:00pm;

Irrigating any landscape more than three days per week;

A complete list of all current prohibitions on water use in the City of Long Beach can be viewed, [HERE](#).

The Declaration of an Imminent Water Supply Shortage is necessitated by the profound impact of a U.S. District Court's August 31<sup>st</sup>, federal Endangered Species Act ruling, the dramatic, recent reductions in water storage levels in key reservoirs in northern California, this year's record low rainfall in the southern California coastal plain, and a continuation of the historic 8-year drought in the Colorado River Watershed, which is a significant source of imported water for southern California. Nearly half of the City's water supply is imported. The City of Long Beach has been under a Declaration of Immediate and Extraordinary Water Conservation since June 14<sup>th</sup>.

"I'd like to stress that while we continue to communicate our need to conserve more of the water we're using, it is increasingly clear that what is going to have to take place in not only our community, but throughout southern California, is a profound lifestyle change in the way all of us think about, and use, water," stated Frank Clarke, President of the Long Beach Board of Water Commissioners. "Our society is using water inefficiently. The faster we reduce inefficient uses, the longer we will be able to delay or avoid all together mandatory cutbacks that will impact us all in a very tangible way."

"What we are experiencing is a profound change in our water supply situation, but I have tremendous confidence in our City and our citizens that we can meet this challenge head-on if we are pro-active and work together," stated Kevin L. Wattier, General Manager of the Long Beach Water Department.

Under the Declaration, the Long Beach Water Department will significantly elevate its public communication urging residents to conserve water, until further action is taken by the Long Beach Board of Water Commissioners. If, subsequent to this Declaration of an Imminent Water Supply Shortage, the water supply situation warrants elevated attention, the Long Beach Board of Water Commissioners may declare more serious Stages of the now activated Emergency Water Supply Shortage Plan, triggering increased mandatory prohibitions on potable water use in the City of Long Beach.

The Long Beach Water Department is an urban, southern California water supply agency and the standard in water conservation and environmental stewardship.

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## **Useful Subject Links:**

Who or what is the Long Beach Board of Water Commissioners?

Where does Long Beach water come from?

How does the Water Department manage its water supply resources?

What will the Long Beach water supply look like in 2015?

What is per capita water use in the City of Long Beach?

How does the Water Department assist customers with conservation?

What can I do to conserve water at home?

What can I do to conserve water at work?

What about drought-friendly landscape?

How can I get a pressurized water broom?

Who is the Water Department's Director of Conservation?

What about Seawater Desalination?

What are the Rules and Regulations of the Board of Water Commissioners?

Who or what is the Metropolitan Water District of Southern California?

**Water Use Prohibitions in the City of Long Beach, as adopted by the Long Beach Board of Water Commissioners, and as incorporated, by reference, in the City of Long Beach Municipal Code:**

- 1) Serving drinking water to any customer in a restaurant or other public place where food is served, sold, or offered for sale unless expressly requested by the customer. The Department shall make "table tents" available to restaurants alerting customers to this restriction and these types of other public places;
- 2) Operating a non-water conserving pre-rinse nozzle in a food-preparation establishment, such as a restaurant or cafeteria;
- 3) Washing driveways, sidewalks, parking areas, patios or other outdoor areas with a hose unless using a water-conserving pressurized cleaning device; a simple spray nozzle does not qualify as a water-conserving pressurized cleaning device;
- 4) Irrigating landscape with potable water any day other than Monday, Thursday, or Saturday, except for very short periods of time for the expressed purpose of adjusting or repairing the irrigation system;
- 5) Irrigating landscape with potable water between the hours of 7:00 a.m. and 6:00 p.m.;
- 6) Irrigating landscape with potable water using stream rotator-type or gear-driven sprinklers for more than fifteen (15) minutes per watering day per station, or for more than ten (10) minutes per watering day per station for all other types of sprinklers. Exempt from these landscape irrigation restrictions are irrigation systems using very low-flow drip-type irrigation when no emitter produces more than two (2) gallons of water per hour;
- 7) Operating an irrigation system which, in the determination of the General Manager, is significantly water-inefficient by virtue of any or all of the following: excessive over spray, misting, over pressurization, misaligned or tilted spray heads, or any other malfunction or out-of-adjustment condition; and
- 8) Irrigating landscape using reclaimed water to the point that the landscape becomes saturated and irrigation waters flow off the landscape.



- 9) Permitting the excess use, loss or escape of water through breaks, leaks or other malfunctions in the water user's plumbing or distribution system for any period of time after such escape of water should have reasonably been discovered and corrected;
- 10) Watering or irrigating lawns, turf, or landscape areas beyond saturation causing significant runoff, as determined by the Long Beach Water Department (Department);
- 11) Operating a fountain or other water feature that does not re-recirculate the water;
- 12) Washing a vehicle with a hose when the hose does not have a water shut-off nozzle or device attached to it or allowing a hose to run continuously while washing a vehicle;
- 13) Using potable water, rather than reclaimed water, after the Department has provided to the customer an analysis showing that reclaimed water is a cost-effective alternative to potable water and the customer has had a reasonable amount of time, as determined by the General Manager of the Department or the General Manager's designee (collectively, "General Manager"), to make the conversion to reclaimed water;
- 14) For water customers that are a hotel or motel, failing to provide customers the option of choosing not to have towels and linens laundered daily. The hotel or motel shall prominently display notice of this option in each bathroom and sleeping room using clear and easily understood language. The Department shall make suitable displays available.

**3. 7/11/06-Letter from the Sierra Club to the City of  
San Diego Water Department**



**SIERRA  
CLUB**  
FOUNDED 1892

Main Office: (619) 299-1743  
Chapter Coordinator: (619) 299-1741  
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Email: [creiff@sierraclubsandiego.org](mailto:creiff@sierraclubsandiego.org)  
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San Diego Chapter  
*Serving the Environment in San Diego and Imperial Counties*  
3820 Ray Street  
San Diego, CA 92104

July 11, 2006

Ms. Mimi Steiner  
Deputy Director, Water Policy and Strategic Planning  
City of San Diego Water Department  
600 B Street, Suite 600, MS 006  
San Diego, CA 92101-4506

Dear Ms. Steiner:

The San Diego Chapter of the Sierra Club was a member of the stakeholders representing a broad cross-section of our community that participated in the public outreach program through the American Assembly process conducted by the City Water Reuse Study team. This Study, requested by the San Diego City Council, is researching options to increase the use of recycled water in the City. At the conclusion of the Study, an impartial, balanced and comprehensive report will be provided to the City Council for input and potential policy direction.


The Sierra Club understands that the Study is analyzing several options to maximize the amount of recycled water that can be produced by the City's two water reclamation plants. Some options involve traditional uses of recycled water such as for landscape irrigation, outdoor construction, and industrial processing. Other options involve using advanced treatment technologies to produce highly treated recycled water to increase drinking water supplies by adding it to groundwater storage basins and water storage reservoirs.

Increasing the production and use of recycled water in the City will provide the following benefits (in part) to City residents and the San Diego area:

- Decrease and offset the amount of water that must be imported into the City from hundreds of miles away.
- Help meet the water needs of population projections that indicate by 2030, the City could need 25 percent more water than it uses today.
- Avoid drought restrictions on outdoor watering that could be mandated on imported water used for this purpose.
- Enhance the environment by reducing treated wastewater discharges into the ocean and by using recycled water to enhance streams and wetlands.

The Sierra Club was a signatory to the American Assembly Statement that was prepared at the final session of the Assembly in July 2005. Accordingly, we strongly support the Water Reuse Study in its efforts to research and analyze all the possible options to increase the use of recycled water for the City of San Diego.

Sincerely,

  
Joe Zechman  
Chair, Executive Committee  
Sierra Club  
San Diego Chapter

**4. 2/23/06-Letter from the San Diego Regional  
Chamber of Commerce to the City of San Diego  
regarding: City of San Diego Water Reuse Study  
2005**



EMERALD PLAZA  
402 West Broadway, Suite 1000  
San Diego, California 92101-3585  
Tel 619.544.1300  
www.sdchamber.org

February 23, 2006

Hon. Scott Peters, President,  
and Hon. Members, City Council  
City of San Diego  
202 C Street, 10<sup>th</sup> Floor  
San Diego, CA 92101

RE: City of San Diego Water Reuse Study 2005

Dear President Peters and Honorable Council Members:

A reliable and affordable water supply is the foundation of San Diego's economic prosperity and quality of life. Water reliability has always been a key issue for the San Diego Regional Chamber of Commerce. Because of water availability, our region was able to attract a cadre of businesses that form San Diego's "new" economies: telecommunications, biomedical, electronics, software, and defense and space manufacturing. Water is a finite and precious natural resource, and we must use it wisely and proactively consider any workable alternatives that bring additional water to San Diego in the future. One such alternative is water reuse.

The San Diego Regional Chamber of Commerce has followed the progress of the City of San Diego's 2005 Water Reuse Study with great interest. Our Water Subcommittee, Infrastructure and Public Policy Committees received detailed presentations by Water Department staff on this issue. Several of our Water Subcommittee members also participated in the American Assembly workshop in July 2005.

The Independent Advisory Panel (IAP), which was convened by City staff, included water researchers and scientists selected by the National Water Research Institute to review the study's design and preliminary results. We understand that there was strong consensus among IAP members that public health related to purified wastewater is not an issue and that the purification process can produce water that is clean and safe. Therefore, the Chamber believes that we all need to work together to make water reuse a new alternative to augment our water supply.

On November 21, 2005, your Public Utilities Advisory Commission (PUAC) recommended that the San Diego City Council (a) adopt the City of San Diego Water Reuse Study 2005 – American Assembly Workshop II Statement as the City's policy on water reuse, specifically the strategies for North City and South Bay including reservoir augmentation and indirect potable reuse; (b) direct City staff to develop as soon as possible a scope of work and strategy to implement the policies, strategies, and projects described in the City of San Diego Water Reuse Study 2005 – American Assembly Workshop II Statement; and (c) direct City staff to report to the Commission not less than annually on implementation of City Water Reuse policies, strategies, and projects described in the City of San Diego Water Reuse Study 2005 – American Assembly Workshop II Statement.

Hon. Scott Peters, President,  
and Hon. Members, City Council  
City of San Diego  
February 23, 2006  
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On December 15, 2005, the San Diego Regional Chamber of Commerce board of directors voted to support the PUAC recommendations, and we urge you to do the same when this issue comes before you. The Chamber believes that the City of San Diego Water Department has done an excellent job in keeping the public informed as the study progressed. We encourage you to continue and expand these public outreach efforts and pledge our support in promoting the importance of water reuse to our membership.

Sincerely,

A handwritten signature in black ink, appearing to read "Scott Alevy", written in a cursive style.

Scott D. Alevy  
Vice President, Public Policy and Communications

SDA:av

cc. Hon. Jerry Sanders, Mayor

**5. Document from the City of Denver, Colorado  
regarding: Chapter 19-Drought Response**

## CHAPTER 19 – DROUGHT RESPONSE

19.01 **Application of this Chapter**. Denver Water has adopted a Drought Response Plan that provides a framework for addressing droughts. Three levels of drought severity have been defined, based on the predicted percentage of storage in Denver Water's reservoirs at the end of the run-off season on July 1. The basic response to a Stage 1 drought is voluntary measures; to a Stage 2 drought, mandatory restrictions; and to a Stage 3 drought, prohibitions on lawn watering. To adopt a particular drought response, the Board of Water Commissioners declares a drought level and adopts an effective date for applicable restrictions. Because Stage 2 and Stage 3 drought restrictions are mandatory, they are incorporated into the Operating Rules where they become enforceable pursuant to the Denver Charter, the Denver Revised Municipal Code and provisions in Denver Water's water service agreements and water leases. This chapter contains the Operating Rules that apply during a Stage 2 or Stage 3 drought, as declared by the Board. Other aspects of drought response will be contained in other documents such as administrative and enforcement guidelines.

19.01.1 **Application of Drought Response within Master Meter Districts**: Water service furnished by Denver Water within master meter districts is governed by the Operating Rules, including this Chapter 19. Under master meter water service agreements, master meter districts retain the right to make and enforce their own rules that are not inconsistent with the Operating Rules, and also agree to exercise their powers to assist Denver Water in enforcing the Operating Rules.

### 19.02 **Stage 2 Drought Response**.

19.02.1 **Irrigation Watering Restrictions**: All customers (owners or occupants of the licensed premises) shall comply with the following watering restrictions from May 1 to October 1, unless exempted by special permission or by means of a water budget:

- a. Watering shall be limited to two days per week in accordance with the following schedule.

Single-family residential properties with  
odd-numbered addresses

Saturday and Wednesday

Single-family residential properties with  
even-numbered addresses

Sunday and Thursday

All others (multi-family, HOA's  
commercial, industrial, government)

Tuesday and Friday



b. Each area of turf shall receive no more than 15 minutes of irrigation on the assigned watering day. All irrigation control systems must be programmed or operated manually to limit irrigation to 15 minutes per zone. Any area covered by a sprinkler attached to a moveable hose (zone) shall also be limited to 15 minutes of watering on the assigned watering day. The Board of Water Commissioners may by formal action establish a maximum total amount of time during which 15-minutes-per-zone irrigation at a premise may occur. This subsection (b) will not apply to athletic or playing fields, so long as irrigation of such fields is accomplished without waste of water.

c. Watering is prohibited between the hours of 10:00 a.m. and 6:00 p.m. and on Mondays.

d. Between October 1 and May 1, outdoor lawn watering shall be prohibited. The watering of turf areas heavily used by the community, such as athletic and playing fields, and tees and greens at golf courses, is not prohibited, but must be conducted without waste of water.

e. Permissible watering shall be conducted without any water waste, as defined in Rule 12.0l.

19.02.2 Exemptions from Irrigation Restrictions: Denver Water may in its discretion grant exemptions from the watering restrictions in Rule 19.02.1, as directed by the Board of Water Commissioners. The Board may approve exemptions for specific uses of irrigation. The Board may approve the use of water budgets for large volume irrigators, which will establish a maximum allowable amount of water, within which the irrigators will be permitted flexibility to choose how and which landscapes to water. In addition to the penalties described in Rule 19.02.10(c), violation of any term or condition of an exemption may result in immediate rescission of the exemption.

19.02.3 Irrigation of Trees and Shrubs: Trees and shrubs may be watered by means of a hand-held hose or low-volume non-spray irrigation on the assigned watering days in Rule 19.02.1(a). From May 1 to October 1, such non-spray irrigation may not occur between the hours of 10:00 a.m. and 6:00 p.m.

19.02.4 Irrigation of Flowers and Vegetables: Flowers, vegetables, and plantings in community gardens may be watered any day except Monday by means of a hand-held hose or low-volume non-spray irrigation. From May 1 to October 1, such non-spray irrigation may not occur between the hours of 10:00 a.m. and 6:00 p.m.

19.02.5 Irrigation System Installation, Operation and Repair. An irrigation system may be operated outside the watering schedule in Rule 19.02.1 for installation, repair or reasonable maintenance, so long as the system is attended throughout the period of operation and water waste does not occur. All irrigation control systems must be reprogrammed for operation in compliance with the schedule in Rule 19.02.1 or must be operated manually.

19.02.6 Outdoor Water Features:

- a. Fountains and Waterfalls. Customers shall be prohibited from operating any existing outdoor fountain or waterfall that sprays water into the air.
- b. Outdoor Misting Devices. Operation of outdoor misting devices shall be prohibited.

19.02.7 Washing of Vehicles:

- a. Personal Vehicles. Personal vehicles may be washed using only a bucket or a hand-held hose equipped with a positive shutoff nozzle. From May 1 to October 1, personal vehicles may be washed only on the days indicated in the schedule in Rule 19.02.1(a) and not between the hours of 10:00 a.m. and 6:00 p.m. From October 1 to May 1, personal vehicles may be washed without day-of-the-week or time-of-day restrictions.
- b. Fleet Vehicles. Vehicles contained in commercial operations or fleets may be washed no more often than once per week, unless public safety requires more frequent washing, and only by means of a car wash or washing equipment certified by Denver Water.
- c. Commercial Car Washes. Commercial car washes are subject to a certification program that will require implementation of industry best management practices or achieve a 30% water savings as compared to a non-recycling car wash. Any commercial car wash that is not certified or in the process of becoming certified, shall be deemed to be in violation of this provision.

19.02.8 Washing of Impervious Surfaces:

a. Power Washing by Individuals. Use of water instead of a broom or mop to clean outdoor impervious surfaces such as sidewalks, driveways and patios is prohibited, except when cleaning with water is necessary for public health or safety reasons or when other cleaning methods are impractical. Cleaning with water as permitted by this section, except for immediate health or safety reasons, may occur only on the assigned watering days indicated in Rule 19.02.1(a) and not between the hours of 10:00 a.m. and 6:00 p.m.

b. Commercial Power Washing. Commercial enterprises for whom cleaning with water is an essential element of their business are not subject to day-of-the-week or time-of-day restrictions, but shall use only high efficiency equipment certified by Denver Water and assure that water waste does not occur.

#### 19.02.9 Food and Lodging Establishments.

a. Restaurants. Restaurants and catering businesses shall not serve water automatically with meals, but may serve water upon the customer's request. Restaurants must comply with Denver Water's signage program.

b. Lodging. Lodging establishments shall not change sheets more often than every four days for guests staying more than one night, except for health or safety reasons. Food service operations in lodging establishments shall not serve water automatically with meals, but may serve water upon the customer's request. Lodging establishments must comply with Denver Water's signage program.

19.02.10 Enforcement of Drought Restrictions: The customer (owner or occupant of the licensed premises) shall be responsible for complying with these drought restrictions, and also with the terms of any exemption granted under Rule 19.02.2. Those who violate any of these Stage 2 drought restrictions will be subject to the penalties in this provision.

a. For a first violation of any Stage 2 drought restriction, the owner or occupant will be advised in writing and informed that a monetary charge will be added to the water bill for subsequent violations.

b. For a second violation of any Stage 2 drought restriction at the same premises, the owner or occupant will be advised in writing, and a \$250 charge may be added to the water bill.

c. For a third violation of any Stage 2 drought restriction at the same premises, the owner or occupant will be advised in writing, and a \$500 charge may be added to the water bill.

d. For a fourth violation of any Stage 2 drought restriction at the same premises, for violation of any term or condition of an exemption granted under 19.02.2, or for willful violation of any drought restriction, the owner or occupant will be advised in writing, and a \$1000 charge may be added to the water bill. In addition, Denver Water may install a flow restrictor on the service line that will remain in place during the irrigation season or may suspend service temporarily until the cause of the violation is corrected and all outstanding penalty and water service charges have been paid.

**19.02.11** Fixed-Amount Water Contracts: Water deliveries to customers who receive raw water, nonpotable water or potable water under fixed-amount contracts will be restricted as follows:

a. For agreements with provisions for reduction in deliveries under drought conditions, the amount delivered shall be reduced by 30%.

b. For agreements with provisions requiring the lessee to adopt the same or similar water use restrictions as Denver Water, the lessee shall implement the water use restrictions contained in this Rule 19.02.

c. For agreements without the provisions described in either subsection (a) or (b), the Board of Water Commissioners may adopt drought surcharges or other methods to achieve reduction in water consumption outside Denver as necessary to provide an adequate supply of water to the people of Denver .

d. Any water delivered by Denver Water between May 1 and October 1 shall not be used for spray irrigation on Mondays or between the hours of 10:00 a.m. and 6:00 p.m.

**19.03** **Stage 3 Drought Response**

**19.03.1** Prohibition on Irrigation: Irrigation of landscaping shall be prohibited, except as

specifically provided in this Rule or unless exempted by special permission or by means of a water budget:

- a. The watering of turf areas heavily used by the community such as athletic and playing fields is not prohibited, but shall be limited to Tuesdays and Fridays. Irrigation of such fields shall be accomplished without waste of water.
- b. Between May 1 and October 1, otherwise permissible watering is prohibited between the hours of 10:00 a.m. and 6:00 p.m.
- c. Permissible watering shall be conducted without any water waste, as defined in Rule 12.0I.

19.03.2 Exemptions from Irrigation Prohibition: Denver Water may in its discretion grant exemptions from the watering prohibition in Rule 19.03.1, as directed by the Board of Water Commissioners. The Board may approve exemptions for specific uses of irrigation. The Board may approve the use of water budgets for large volume irrigators, which will establish a maximum allowable amount of water, within which the irrigators will be permitted flexibility to choose how and which landscapes to water. In addition to the penalties described in Rule 19.03.10(c), violation of any term or condition of an exemption may result in immediate rescission of the exemption.

19.03.3 Irrigation of Trees and Shrubs: Existing trees and shrubs may be watered by means of a hand-held hose or low-volume non-spray irrigation no more than once a week in accordance with the following schedule. From May 1 to October 1, such irrigation may not occur between the hours of 10:00 a.m. and 6:00 p.m. No new trees or shrubs may be planted.

Single-family residential properties with odd-numbered addresses	Saturday
Single-family residential properties with even-numbered addresses	Sunday
All others (multi-family, HOA's commercial, industrial, government)	Wednesday

19.03.4 Irrigation of Flowers and Vegetables: Existing flowers, vegetables, and plantings in community gardens may be watered any day except Monday by means of a hand-held hose or low-volume non-spray irrigation. From May 1 to October 1, such irrigation may not occur between the hours of 10:00 a.m. and 6:00 p.m. No new flowers or vegetables may be planted.

19.03.5 Irrigation System Installation, Operation and Repair: An irrigation system may be operated despite the prohibition in Rule 19.03.1 for installation or repair, so long as the system is attended throughout the period of operation and water waste does not occur.

19.03.6 Outdoor Water Features:

- a. Fountains and Waterfalls. Customers shall be prohibited from operating any existing outdoor fountain or waterfall that sprays water into the air. No new outdoor fountain or waterfall may be put into operation during a Stage 3 drought response.
- b. Misting Devices. Operation of outdoor misting devices shall be prohibited.
- c. Swimming Pools. Single-family residential pools shall not be filled or refilled. Operation of other pools will be permitted.

19.03.7 Washing of Vehicles:

- a. Personal Vehicles. Washing of personal vehicles shall be prohibited except at commercial car washes certified as described in subsection (c).
- b. Fleet Vehicles. Vehicles contained in commercial operations or fleets may be washed no more often than once per month, unless public safety requires more frequent washing, and only by means of a car wash or washing equipment certified by Denver Water.
- c. Commercial Car Washes. Commercial car washes are subject to a certification program that will require a 50% water savings as compared to a non-recycling car wash. Any commercial car wash that is not certified or in the process of becoming certified, shall close down its washing operations three days each week as designated by Denver Water in order to save water.

19.03.8 Washing of Impervious Surfaces:

- a. Power Washing by Individuals. Use of water instead of a broom or mop to clean outdoor impervious surfaces such as sidewalks, driveways and patios is prohibited, except when cleaning with water is necessary for immediate public health or safety reasons.
- b. Commercial Power Washing. Commercial enterprises shall clean with water only for health or safety purposes, and shall use only high efficiency equipment certified by Denver Water and assure that water waste does not occur.
- c. Hydrant Permits. Water obtained by means of a hydrant permit shall not be used for cleaning equipment or any other use prohibited during a Stage 3 drought.

19.03.9 Food and Lodging Establishments.

- a. Restaurants. Restaurants and catering businesses shall not serve water automatically with meals, but may serve water upon the customer's request. Restaurants must comply with Denver Water's signage program.
- b. Lodging. Lodging establishments shall not change sheets more often than every four days for guests staying more than one night, except for health or safety reasons. Food service operations in lodging establishments shall not serve water automatically with meals, but may serve water upon the customer's request. Lodging establishments must comply with Denver Water's signage program.

19.03.10 Enforcement: The customer (owner or occupant of the licensed premises) shall be responsible for complying with these drought restrictions, and also with the terms of any exemption granted under Rule 19.03.2. Those who violate any of these Stage 3 drought restrictions will be subject to the penalties in this provision.

- a. For a first violation of any Stage 3 drought restriction, the owner or occupant will be advised in writing and informed that a monetary charge will be added to the water bill for subsequent violations.

b. For a second violation of any Stage 3 drought restriction at the same premises, the owner or occupant will be advised in writing, and a \$1000 charge may be added to the water bill.

c. For a third violation of any Stage 3 drought restriction at the same premises, for violation of any term or condition of an exemption granted under 19.03.2, or for willful violation of any drought restriction, the owner or occupant will be advised in writing, and a \$1500 charge may be added to the water bill. In addition, Denver Water may install a flow restrictor on the service line that will remain in place during the irrigation season or may suspend service temporarily until the cause of the violation is corrected and all outstanding penalty and water service charges have been paid.

19.03.11 Fixed-Amount Water Contracts: Water deliveries to customers who receive raw water, nonpotable water or potable water under fixed-amount contracts will be restricted as follows:

a. For agreements with provisions for reduction in deliveries under drought conditions, the amount delivered shall be reduced by 50%.

b. For agreements with provisions requiring the lessee to adopt the same or similar water use restrictions as Denver Water, the lessee shall implement the water use restrictions contained in this Rule 19.03.

c. For agreements without the provisions described in either subsection (a) or (b), the Board of Water Commissioners may adopt drought surcharges or other methods to achieve reduction in water consumption outside Denver as necessary to provide an adequate supply of water to the people of Denver .

d. Any water delivered by Denver Water between May 1 and October 1 shall not be used for otherwise permissible irrigation on Mondays or between the hours of 10:00 a.m. and 6:00 p.m.

19.04 Appeal Process: Any person subject to a charge for violation of a provision of this Chapter 19 may appeal the charge in writing to Denver Water. The appeal must be received by the Customer Service Office within 10 business days of the date of the violation notice.



a. Response by Customer Service. The Customer Service Office must respond to the appealing owner or occupant with 10 business days of receipt of an appeal, or the charge will be removed from the account.

b. Denial of Appeal. If Customer Service denies the appeal, the appealing owner or occupant may submit the appeal in writing to the Sales Administrator. The written appeal must be received by the Sales Administrator within 10 business days of the date of the denial by Customer Service. The decision of the Sales Administrator on the matter shall be final.

c. Payment of Charges During Appeal. The customer must pay the water bill, including the charge imposed under Rule 19.02.10 or Rule 19.03.10 by the due date of the water bill. If the customer's appeal is approved, the disputed charge will be credited on the next water bill.

**19.05 Use of Water Not Controlled or Provided by Denver Water.** Some customers may have available to them sources of water that are not owned, controlled or provided by Denver Water. While the use of such water in a drought is not under the direct control of Denver Water, the following rules apply to the owner or occupant of a licensed premise using non-Denver water. Failure to comply with these rules will be deemed to be a drought restriction violation under either Rule 19.02.10 or 19.03.10, depending on the severity of the drought.

a. To ensure that the water is in fact not Denver Water's, the customer shall provide certification demonstrating the source of the water and that the water is being used in compliance with any legal restrictions on the use of water from that source.

b. To avoid confusing the public, the premise where the non-Denver water is being applied shall display prominent signage indicating that the water is not being supplied by Denver Water.

c. To avoid potential contamination of Denver Water's potable water supply system, any irrigation or other system using non-Denver water shall be physically disconnected from Denver Water's potable system. In addition, the Denver Water service line providing potable water to the premises must include an approved backflow prevention device, and the customer must execute a Dual Water Supply Agreement with Denver Water.

d. To prevent the waste of water, which could increase the customer's need for Denver Water's supplies, irrigation with non-Denver water shall be prohibited during the hours from 10:00 a.m. to 6:00 p.m.

Operating Rules Table of Contents

**6. Document from Park City, Utah regarding: 13-  
Water Conservation**

# Park City Water Conservation

## **13- 1-22. WATER CONSERVATION.**

In order to conserve water, a limited resource in Utah, outside watering of lawns and landscaped areas using City water will be restricted to every other day from May 1 to September 30. Outside watering at even-numbered street addresses shall be limited to even-numbered days of the month and outside watering at odd-numbered addresses shall be limited to odd-numbered days of the month. Hours of outside watering shall be restricted to between 7:00 p.m. and 10:00 a.m. Exceptions to these outside watering restrictions may be permitted, in writing, by the Public Works Director for new landscaping and seeding.

## **13- 1-23. WATER EMERGENCIES.**

The Mayor may declare by executive order, or the City Council may declare by resolution, a state of water emergency when it appears to the Mayor or the City Council that the City's water sources are incapable of producing sufficient water to meet all the needs of the City's water users.

(A) During a declared water emergency, water service may be interrupted in any or all parts of the City in order to effect repairs, provide water for fire fighting, or for any other good cause. Upon the expiration of the emergency, water service shall be restored without charge.

(B) Upon such a declaration, and for the duration of the state of water emergency, it shall be unlawful to use Park City Municipal water supply water for outside irrigation, watering, or sprinkling uses, except as provided in Paragraph "(C)" of this section .

(C) The declaration of state of water emergency shall specify outside watering and irrigation schedules and may specify other water conservation measures appropriate to the circumstances of the emergency.

(D) Violations of this section are infractions punishable by a fine but not imprisonment. The maximum fine shall not exceed five hundred dollars (\$500.00) for each violation.

(E) The owner or tenant of property cited for illegal watering or irrigation under this Title shall be required to pay a penalty in the amount set forth by resolution and, if the allegations in the citation are not contested, may forfeit the penalty in lieu of trying the charges.

(F) Bail and/or fines shall be paid to Park City Municipal Corporation by cash or check to the City's post office box (which shall be stated on all citations) or at the City offices. Unpaid, uncontested bail forfeitures and fines may be debited against the municipal water account of the cited party and will be subject to collection pursuant to City water bill collection policies.

(G) The provisions of this Title shall not apply insofar as the watering restrictions established herein are in conflict with any provision of the Park City Land Management Code.

## **13- 1-27. PENALTY.**

All violations of this Title (except those set forth in Section 13-1-23 ) shall be a Class B misdemeanor, punishable by a fine not exceeding one thousand dollars (\$1,000) and incarceration not exceeding six (6) months. Unauthorized taking of water is theft of services and may be a felony if the taking exceeds a value of one thousand dollars (\$1,000).

**7. Document from the City of Santa Fe, New Mexico  
regarding: New Water Use Requirements**



# NEW WATER USE REQUIREMENTS

On November 14, 2001, the Santa Fe City Council adopted a host of new water conservation requirements to further promote wise water use in our city. In part, the intent is to minimize our vulnerability to future water shortage emergencies through aggressive water conservation. These provisions apply to all customers on the city water system and all water users within the city limits (e.g. private well users).



## ***Restaurants and Banquet Operations Shall Only Serve Water and Other Beverages Upon Request***

This provision includes unstaffed banquet operations (i.e. pre-setting of water and ice tea is not permitted). Beverages in single serving containers (e.g. cans or bottles) shall not be served with an accompanying glass unless requested by the customer. These provisions must be posted in a manner visible to the customer (on the menu, as a table tent, or as a sign posted in a prominent location).

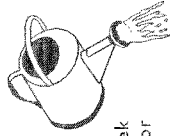
## ***Plant Nurseries***

1. Shall make City-provided conservation literature readily available to their customers
2. Are strongly encouraged to tag or sign their low water use plants that require little to no supplemental watering

In addition to the general conservation literature requirement, customers purchasing turf seed or sod shall be provided city literature indicating the restrictions to planting cool season water consumptive turf under the City's new landscape ordinance. Among other provisions, the landscape ordinance does not allow the planting of turf seed or sod in excess of 25% Kentucky bluegrass content. However, the ordinance does not prohibit the sale or purchase of Kentucky bluegrass - just the planting of Kentucky bluegrass within the city limits.

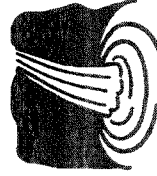
## ***Fugitive Water and Water Waste Prohibited***

"Fugitive water", usually involved with watering landscaping, is when water flows onto hard surfaces or leaves the landscaped area intended to be watered. The water does not need to flow off property to be a fugitive water violation. The irrigation system shall not be operated again until the problem (e.g. broken sprinkler head) has been repaired. Washing hard surfaces is only allowed for public health and safety reasons. Vehicle washing is allowed if a shut-off hose nozzle is in use. Hose washing of outdoor eating areas is not permitted. "Water waste" is any indoor or outdoor leak in excess of 0.25 gallons per minute (gpm). Indoor leaks (e.g. faucets and toilets) must be repaired within 15 calendar days. Your facility manager and your landscape maintenance company (if you have one) need to be well aware of these provisions.



## ***Landscape Watering Prohibited 10 am to 6 pm, May through October***

The previous 3 day per week "odd-even address" outdoor watering restriction has been removed. However, we emphasize that most established landscaping can do well on just once per week watering.

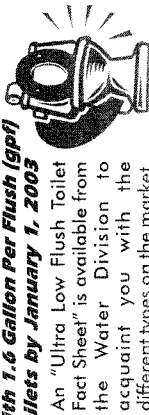


## ***Compliance***

For violation of any of the provisions noted above, "Water Use Citations" will be issued. Citation fees will be assessed on the water bill and range from \$20 for the 1st violation to \$200 for the 4th and each subsequent violation. As a last resort, discontinuance of water service will be considered for habitual violators.

## New Water Use Requirements continued...

### Buildings Must Be Retrofitted With 1.6 Gallon Per Flush (gpf) Toilets by January 1, 2003



An "Ultra Low Flush Toilet Fact Sheet" is available from the Water Division to acquaint you with the different types on the market.

Contrary to a common rumor, the newer generation ULFT's work quite well. Toilets that use a "quick closing flapper" to limit the flush to 1.6 gpf may not be used to satisfy this requirement. In addition, buildings must have low flow showerheads (2.5 gal/min) and faucet aerators (2.5 gpm or less) by January 1, 2003. These provisions do not apply to homes or multi-family apartment complexes.



### Conservation Sign in All Public Restrooms

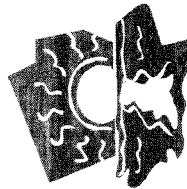
This requirement has existed since 1997. Signs are available from the Water Division or entities may make their own signs using the City-established text.

### Lodging Facilities

1. May not provide daily linen and towel changing for multiple night guests unless the guest specifically requests it
2. Shall provide a conservation informational card or brochure in each guest room

Lodging facilities commonly instruct their guests to place a request card on the bed and to throw the towels in the bathtub if linen and towel changing are desired. A request card "table tent" and conservation information towel rack hanger are being jointly produced by the City and the Santa Fe Lodgers Association and will soon be available from the Water Division. Lodging facilities may develop their own request card and conservation literature.

These provisions are legally enforceable requirements. However, the City's goal is to assist water users in any way possible to prevent violations from occurring in the first place. Our emphasis is on ensuring wise water use not on issuing as many citations as possible.



**Thank you for making Santa Fe a  
"Water Friendly" community!**



**City of Santa Fe**

**For assistance or more information call 954-7199.**

**8. 6/03- Recommendations of California's Recycled  
Water Task Force titled: Water Recycling 2030**



# Water Recycling 2030

Recommendations of California's  
Recycled Water Task Force



JUNE 2003

*Cover photo: Village Green in El Dorado Hills,  
California utilizes recycled water for this constructed  
lake and landscape irrigation.*

*Photo taken by Dale Kolke (DWR)*

*Copies of Water Recycling 2030 may be obtained from:  
Department of Water Resources  
P.O. Box 942836  
Sacramento, CA 94236-0001  
(916) 653-1097*

## Executive Summary

*To meet the needs of California's projected population of 52 million in the year 2030, the State's water supply must be augmented and made more efficient. Water conservation, recycling, desalination, trading and storage of surface and groundwater are the components that will successfully manage the State's overall water supply.*

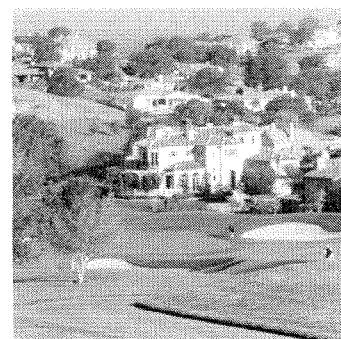
*Since the 1890s, Californians have been reusing municipal wastewater for agriculture and farm irrigation. By the early 1900s, communities began using recycled water (treated wastewater) for landscape irrigation. Currently, California is recycling approximately 500,000 acre-feet of water per year for various uses.*

*California has the potential to recycle up to 1.5 million acre-feet per year of water by the year 2030. This could free up freshwater supplies to meet approximately 30 percent of the household water needs associated with projected population growth. However, to achieve that potential, Californians will have to invest nearly \$11 billion (approximately \$400 million annually) for additional infrastructure to produce and deliver the recycled water.*

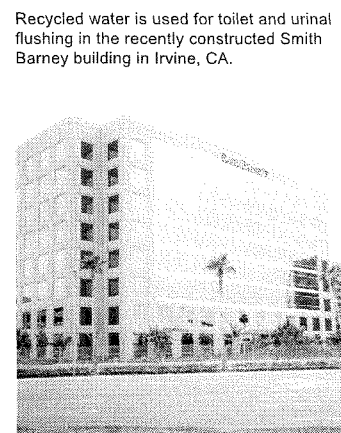
*The most common recycled water uses include: (1) landscape irrigation of highway medians, golf courses, parks, and schoolyards; (2) industrial uses such as power station cooling towers, oil refinery boiler feed water, carpet dyeing, recycled newspaper processing, and laundries; and (3) agricultural uses such as irrigation of produce, pastures for animal feed, and nursery plant products. Recently, recycled water use has expanded to office buildings for toilet flushing.*

*In coastal areas, excessive groundwater pumping results in seawater intrusion, which contaminates the aquifers with salt water. Recycled water is used to recharge the aquifers along the coast. This creates a hydraulic barrier to the inflow of seawater, thus protecting the quality and replenishing the supply of the inland groundwater.*

*Groundwater aquifers have been recharged with recycled water in California since the 1960s. Because groundwater aquifers serve as potable water supply basins, groundwater recharge, including seawater intrusion barriers, is considered an indirect potable reuse. The Department of Health Services (DHS) requires advanced treatment of recycled water before it is used to recharge groundwater aquifers. These treatment requirements are more restrictive than the typical requirements for discharges to inland surface or coastal waters.*



Serrano Country Club, irrigated with recycled water in El Dorado Hills, CA. Over 125 golf courses use recycled water in California.



Recycled water is used for toilet and urinal flushing in the recently constructed Smith Barney building in Irvine, CA.



At the final meeting of the Recycled Water Task Force, Thomas Hannigan (L.), Director of DWR, listens to Assemblymember Jackie Goldberg, author of AB 331, which mandated creation of the Task Force.

*Assembly Bill No. 331 was passed by the California Legislature, and signed into law by Governor Gray Davis on October 7, 2001. The bill required the creation of the 2002 Recycled Water Task Force (Task Force) to identify constraints, impediments, and opportunities for the increased use of recycled water and report to the Legislature by July 1, 2003. Although water recycling includes treatment of a broad range of wastewater sources, the Task Force decided to focus on the planned reuse of treated municipal wastewater; specifically, the financial/economic, regulatory, and social issues that typically arise in water recycling projects.*

*Representatives of federal, State, and local agencies, private entities, environmental organizations, universities, concerned individuals and public-interest groups were appointed to the 40-member Task Force in April 2002. The Task Force includes experts in the field of water recycling, including those involved in the production and use of recycled water, public health officials, world-renowned researchers, environmental organizations, and the public. The Task Force established committees (workgroups) to focus on specific topics of concern and produce reports that served as a basis of Task Force decision-making. The Department of Water Resources (DWR), the State Water Resources Control Board (SWRCB), and the DHS provided technical assistance to the Task Force and its workgroups.*

*DHS' regulations prescribe the level of treatment necessary for the various uses of recycled water. In general, the public has accepted these regulations as being adequate for protection of public health. There are successful indirect potable reuse projects involving groundwater recharge in California and new projects continue to be proposed. However, in some instances, the public has not been receptive to the concept of using recycled water to recharge groundwater basins that serve as drinking water supply sources. Some indirect potable reuse proposals have been mischaracterized by images of recycled water being fed directly into drinking water pipeline systems. The Task Force found the need to involve the public much earlier in the decision-making process for projects, to make the process much more transparent and to provide facts early on in project planning. Therefore, the Task Force devoted considerable attention to issues surrounding public health and the need for increased education and outreach related to the facts and scientific research about recycled water.*

*Other critical issues include the lack of local funding for (1) water recycling infrastructure, (2) research on emerging contaminants, and (3) public health concerns. These have also been identified as impediments to increased water recycling statewide. A financial incentive for the local development of water recycling projects is an effective tool for the construction of water recycling facilities and infrastructure, as evidenced by the SWRCB's Propositions 13 and 50 loan and grant programs. Therefore, the need for additional State funding to provide local water recycling funding assistance is also reflected in the recommendations.*

*The Task Force identified and adopted 26 issues with respective recommendations to address obstacles, impediments, and opportunities for California to increase its recycled*

Displaying interagency cooperation, the Task Force was led by (from left) David Spath (DHS), Eric Schockman (facilitator), Richard Katz (SWRCB), and Jonas Minton (DWR), Fawzi Karajeh (DWR).



water usage. Recommendations associated with thirteen of these issues were adopted as key recommendations deserving of more immediate attention. The 26 issues and a summary of the recommendations follow. The issues have been numbered as shown in parentheses to correspond to their numbers assigned in Chapters 4, 5, and 6 of the report.

### **Key Issues and Recommendations Summary:**

**Funding for Water Recycling Projects (1.1)** - State funding for water reuse/recycling facilities and infrastructure should be increased beyond Proposition 50 and other current sources.

**Community value-based Decision-making Model for Project Planning (2.1)** - Local agencies should engage the public in an active dialogue and participation using a community value-based decision-making model in planning water recycling projects. Public participation activities should go beyond the minimum requirements of State and federal environmental laws, perhaps being reinforced by State funding agencies requiring a comprehensive public participation process as a condition for receiving State funds.

**Leadership support for water recycling (2.2)** - State government should take a leadership role in encouraging recycled water use and improve consistency of policy within branches of State government. Local agencies should create well-defined recycled water ordinances. Local regulatory agencies should effectively enforce these ordinances. The State should convene an independent statewide review panel on indirect potable reuse to ensure adequate health and safety assurance for California residents.

**Educational Curriculum (2.3)** - The State should develop comprehensive education curricula for public schools; and institutions of higher education should incorporate recycled water education into their curricula. Governmental and nongovernmental organizations should enhance their existing public education programs.

**State-sponsored media campaign (2.4)** - The State should develop a water issues information program, including water recycling, for radio, television, print, and other media.

**Uniform Plumbing Code Appendix J (3.1)** - The State should revise Appendix J of the Uniform Plumbing Code, which addresses plumbing within buildings with both potable and recycled water systems, and adopt a California version that will be enforceable in this State.

**DHS Guidance on Cross-connection Control (3.2)** - The Department of Health Services should prepare guidance that would clarify the intent and applicability of Title 22, Article 5 of the California Code of Regulations pertaining to dual plumbed systems and amend this article to be consistent with requirements included in a California version of Appendix J that the Task Force is recommending to be adopted.

**Health and Safety Regulation (4.1)** - The Department of Health Services should involve stakeholders in a review of various factors to identify any needs for enhancing existing local and State health regulation associated with the use of recycled water.

**Incidental Runoff (4.2)** - The State should investigate, within the current legal framework, alternative approaches to achieve more consistent and less burdensome regulatory mechanisms affecting incidental runoff of recycled water from use sites.

**Uniform Interpretation of State Standards (4.3)** - The State should create uniform interpretation of State standards in State and local regulatory programs by taking specific steps recommended by the Task Force, for example, appointing an ombudsman in the State Water Resources Control Board to oversee uniformity within the SWRCB and the Regional Water Quality Control Boards.

**Water Softeners (4.4)** - The Legislature should amend the Health and Safety Code Sections 116775 through 116795 to reduce the restrictions on local ability to impose bans on, or more stringent standards for, residential water softeners. Within the current legal provisions on water softeners, local agencies should consider publicity campaigns to educate consumers regarding the impact of self-regenerative water softeners.

**Uniform Analytical Method for Economic Analyses (5.1)** - A uniform and economically valid procedural framework should be developed to determine the economic benefits and costs of water recycling projects for use by local, State, and federal agencies. Guidance should be developed to conduct economic feasibility analyses, incorporating nonmarket values to the extent possible. Appropriate benchmarks for comparing incremental costs of developing recycled water with the cost of developing an equivalent amount through alternative measures. An advisory team should be created by the Department of Water Resources, the State Water Resources Control Board, and the Department of Health Services to assist these tasks.

**Research Funding (6.1)** - The State should expand funding sources to include sustainable State funding for research on recycled water issues.

**University Academic Program for Water Recycling (6.2)** - The State should encourage an integrated academic program on one or more campuses for water recycling research and education, such as through State research funding.

### ***Additional Important Issues and Recommendations Summary:***

**Funding Coordination (1.2)** - A revised funding procedure should be developed to provide local agencies with assistance in potential State and federal funding opportunities. A Water Recycling Coordination Committee should be established to work with funding agencies, streamlining project selection within individual agencies while ensuring an open process, peer review, and public review.

**Regional Planning Criterion (1.3)** - State funding agencies should make better use of existing regional planning studies to determine the funding priority of projects. This process would not exclude projects from funding where regional plans do not exist.

**Funding Information Outreach (1.4)** - Funding agencies should publicize funding availability through workshops, conferences, and the Internet.

**Department of Water Resources Technical Assistance (1.5)** - Funding sources should be expanded to include sustainable State funding for DWR's technical assistance and research, including flexibility to work on local and regional planning, emerging issues, and new technology.

**Project Performance Analysis (1.6)** - Resources should be provided to funding agencies to perform comprehensive analysis of the performance of existing recycled water projects in terms of costs and benefits and recycled water deliveries. An estimate should be performed of future benefits potentially resulting from future investments.

**Recycled Water Symbol Code Change (3.3)** - The Department of Housing and Community Development should submit a code change to remove the requirement for the skull and crossbones symbol in Sections 601.2.2 and 601.2.3 of the California Plumbing Code.

**Stakeholder Review of Proposed Cross-connection Control Regulations (3.4)** - Stakeholders are encouraged to review Department of Health Services draft changes to Title 17 of the Code of Regulations pertaining to cross-connections between potable and nonpotable water systems.

**Cross-connection Risk Assessment (3.5)** - The Department of Health Services should support a thorough assessment of the risk associated with cross-connections between disinfected tertiary recycled water and potable water.

**Permitting Procedures (4.5)** - Various measures should be conducted to improve the administration and compliance with local and State permits, including providing Department of Health Services guidance, dissemination of information by the Association of California Water Agencies and the California Association of Sanitation Agencies, and State and local tax incentives to offset costs of compliance with regulations.

**Source Control (4.6)** - Local agencies should maintain strong source control programs and increase public awareness of their importance in reducing pollution and ensuring a safe recycled water supply.

**Economic Analyses (5.2)** - Local agencies are encouraged to perform economic analyses in addition to financial analyses for water recycling projects to provide transparency regarding the true costs and benefits of projects. State and federal agencies should require economic and financial feasibility as two funding criteria in their funding programs.



Kirk Bone signs the Task Force report, witnessed by Fawzi Karajeh (l.) and Al Vargas (r.).

*Statewide Science-based Panel on Indirect Potable Reuse (6.3) - As required by AB 331, the Task Force reviewed the 1996 report of the California Indirect Potable Reuse Committee and other related advisory panel reports and concluded that reconvening this committee would not be worthwhile at this time.*

*Details concerning the recommendations are contained in the report.*

*The Task Force intends for this report to be used as a working tool to guide the Legislature, State government, public agencies, the public and all water recycling stakeholders towards the safe and successful expansion of recycled water use to help meet the State's future water supply needs.*



## CHAPTER 2

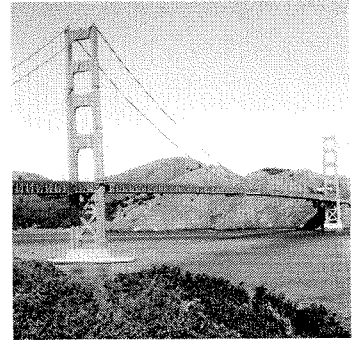
# Role & Potential of Water Recycling

California's current population of 35 million is expected to grow by roughly 17 million by 2030, a 50 percent increase. To meet the water demands associated with this growth, it will be necessary to develop a balanced portfolio of water resources, not only the traditional storage projects, but also an array of other types of facilities and management techniques, such as water transfers, water conservation, desalination, and, most certainly, water recycling. Based on the potential for additional recycled water use developed later in this chapter, recycled water could free up enough fresh water to meet the household water demands of 30 to 50 percent of the additional 17 million Californians. To achieve this potential, an investment of \$11 billion would be needed.

### RECYCLED WATER USE IN CALIFORNIA

Water recycling has been taking place in California as early as 1890 for agriculture, although it is likely that the wastewater was untreated at that time. By 1910 at least 35 communities were using wastewater for farm irrigation, 11 without wastewater treatment and 24 after septic tank treatment. Landscape irrigation in Golden Gate Park in San Francisco began with raw sewage, but due to complaints, minimal treatment was added in 1912. Since then wastewater treatment standards have been greatly improved to protect public health.

By 1952 there were 107 communities using recycled water for agricultural and landscape irrigation. The first comprehensive statewide estimate of water reuse of municipal wastewater was made in 1970, when 175 thousand acre-feet of recycled water were used. In 2000, this amount had increased to 402 thousand acre-feet. The recycled water was supplied by 234 wastewater treatment plants and delivered to over 4,800 sites. Currently recycled water use is estimated to be within a range of 450 to 580 thousand acre-feet per year. The trend in use is illustrated in Figure 1.



The Golden Gate of San Francisco Bay, home of several water recycling projects to meet water needs and protect the water quality of the bay.

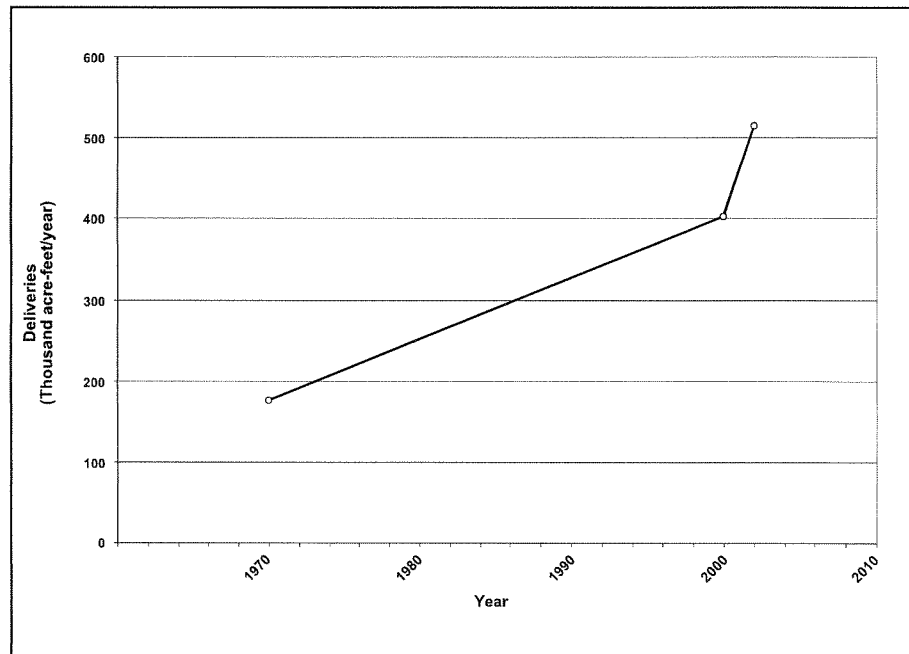
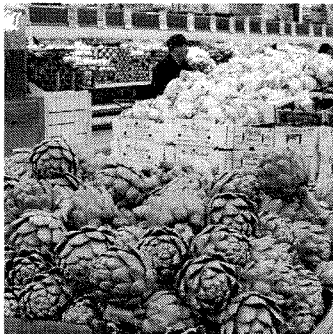


Figure 1. Recycled Water Use in California for 1970 to 2002.



Artichokes grown in Castroville with recycled water are now in markets after a 5-year study to demonstrate the safety of recycled water for food crops.

Recycled water is being used in a variety of ways, as illustrated in Figure 2. At least 20 varieties of food crops are grown with recycled water, including vegetables eaten raw, such as lettuce and celery. Eleven non-food crops, especially pasture and feed for animals, as well as nursery products, are irrigated with recycled water. Landscape irrigation is primarily for turf, including over 125 golf courses and many parks, schoolyards and freeway landscaping. Industrial and commercial uses include cooling towers in power stations, boiler feed water in oil refineries, carpet dyeing, recycled newspaper processing, and laundries. Recycled water is being used in office buildings for toilet and urinal flushing.

In many groundwater basins in California, the rate of pumping exceeds the rate of natural replenishment. Artificial recharge of groundwater is practiced in some areas by percolating either stormwater captured from streams, imported water, or recycled water into aquifers. The most notable use of recycled water for this purpose is recharge in the Montebello Forebay Groundwater Project in the vicinity of Whittier, which has occurred since 1962. In coastal areas where excessive groundwater pumping has taken place, the groundwater levels have fallen to the extent that seawater has been drawn inland, contaminating aquifers. Recycled water has been injected into the aquifers along the coast to create barriers to the seawater, thus protecting the groundwater while, in part, also replenishing the aquifer. Highly treated recycled water has been injected into a seawater barrier in Orange County since 1976 and a newer project operates along the coast in Los Angeles County.

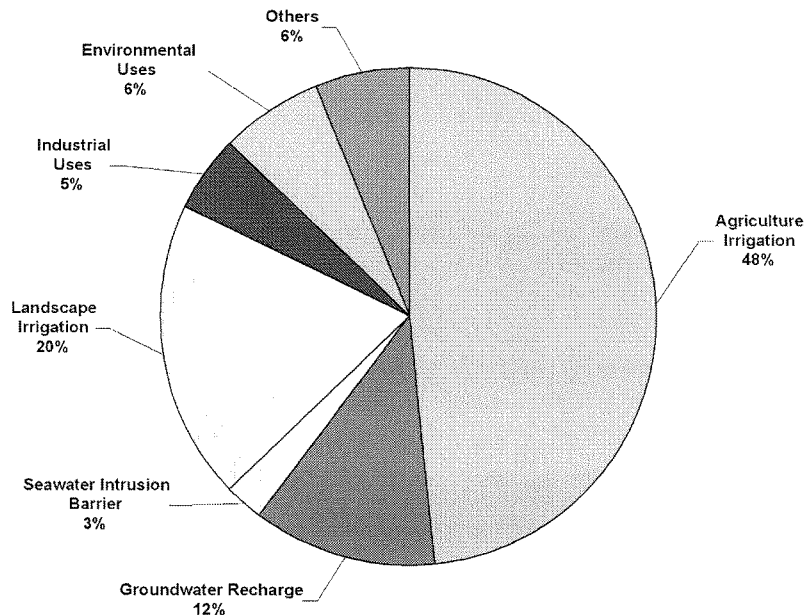


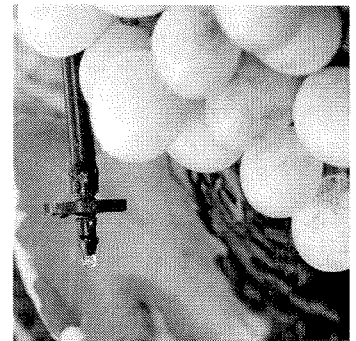
Figure 2. Types of Recycled Water Use in California (SWRCB, 2000).

## WATER RECYCLING FUNDAMENTALS

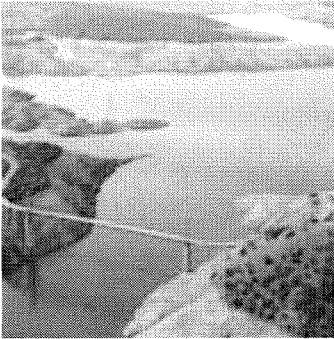
Projects are initiated to serve particular objectives. Use of recycled water is motivated with a particular objective in mind and is often evaluated as one of several alternatives before determining that recycled water use is the most cost-effective means of meeting one or more objectives. There are several objectives that have led to the use of recycled water in California:

1. An incidental secondary benefit to the disposal of wastewater, primarily crop production by irrigation with effluent,
2. A water supply to displace the need for other sources of water,
3. A cost-effective means of environmentally sound treatment and disposal of wastewater,
4. A water supply for environmental enhancement.

Historically, agricultural use of recycled water predominated in California and occurred mostly in the Central Valley, where farm land was located adjacent to wastewater treatment facilities. The farm land offered a convenient place for disposal of effluent, and sometimes the sale of recycled water to nearby farmers offered a source of income to reduce costs to sewer users even when facilities were available for discharge to surface waters. As treatment standards were raised to protect the environment, land application was looked at more seriously as a cost-effective means of treatment and disposal of wastewater as opposed to discharge into streams. However, in recent decades, the emphasis in promoting water reuse has been more on the water supply benefits to meet demands in water-short areas. Water recycling is evaluated in comparison with other means of enhancing water supplies. Most projects now occur in urban areas, and uses have shifted more toward urban uses, such as landscape irriga-



Recycled water is used on vineyards in Fresno, San Diego, and Sonoma Counties.



Surface water reservoirs are a major source of water in California, but during droughts, as shown here at Lake Oroville, recycled water can be a more reliable supply.

tion and industrial use. Environmental enhancement, such as wetlands restoration, can be another, but certainly less prevalent, motivation.

Aside from meeting one or more of the major project objectives described above, there can be potential secondary benefits:

1. Provide additional reliable local sources of water, nutrients, and organic matter for agricultural soil conditioning and reduction in fertilizer use,
2. Reduce the discharge of pollutants to water bodies, beyond levels prescribed by regulations, and allow more natural treatment by land application,
3. Provide a more secure water supply during drought periods,
4. Provide economic benefits resulting from a more secure water supply.

The degree and type of wastewater treatment that is provided to make recycled water suitable for use depends on the types of use, the potential exposure of humans to recycled water and the public health implications, and the water quality required beyond health considerations. The basic levels of treatment include primary, secondary, and tertiary. Not all wastewater receives all three levels of treatment. Secondary treatment is commonly the minimum level of treatment for discharge to surface waters and for many uses of recycled water. Tertiary treatment is sometimes required for discharge to surface waters to protect fisheries or protect some uses of the waters. Tertiary treatment is often required for recycled water where there is a high degree of human contact. Disinfection is usually required for either discharge or recycled water use to kill viruses and bacteria that can cause illness.

The Department of Health Services specifies the levels of treatment for recycled water and publishes the standards in Title 22 of the California Code of Regulations. Examples of types of use and the prescribed levels of treatment are shown in Table 1. Beyond the treatment required for health protection, certain uses have specific water quality needs. High sodium or boron in water can be harmful to crops. Water hardness can cause scaling in industrial boilers. Nitrogen and phosphorus can stimulate algal growth in ponds or cooling towers. Sometimes specialized forms of tertiary treatment are needed to remove specific chemicals that would make recycled water unusable.

Most recycled water projects are designed to provide one level of water quality to all customers connected to the recycled water distribution system. If only a few potential customers need a special quality of water, it may not be economical to treat all of the recycled water to meet these special quality requirements. In recent years a more innovative approach is being practiced. Some customers with special quality needs may be served by their own pipeline from the wastewater treatment plant, and the recycled water producer provides two or more qualities of recycled water. If a single customer has special needs, the standard quality of recycled water is delivered to the customer's site and a customized treatment facility at the site provides the added treatment to bring the quality up to the standards of the customer. West Basin Municipal Water District in Southern

Table 1. Examples of Minimum Treatment Levels to Protect Public Health.

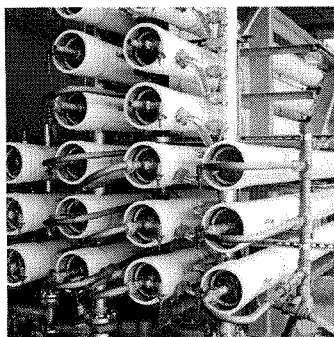
Types of Use	Treatment Level		
	Disinfected Tertiary	Disinfected Secondary	Undisinfected Secondary
<b>Urban Uses and Landscape Irrigation</b>			
Fire protection	√		
Toilet & Urinal Flushing	√		
Irrigation of Parks, Schoolyards, Residential Landscaping	√		
Irrigation of Cemeteries, Highway Landscaping		√	
Irrigation of Nurseries		√	
Landscape Impoundment	√	√*	
<b>Agricultural Irrigation</b>			
Pasture for milch animals		√	
Fodder and Fiber Crops			√
Orchards (no contact between fruit and recycled water)			√
Vineyards (no contact between fruit and recycled water)	√		√
Non-Food Bearing Trees			√
Food Crops Eaten After Processing		√	
Food Crops Eaten Raw	√		
<b>Commercial/Industrial</b>			
Cooling & Air Conditioning - w/cooling towers	√	√*	
Structural Fire Fighting	√		
Commercial Car Washes	√		
Commercial Laundries	√		
Artificial Snow Making	√		
Soil Compaction, Concrete Mixing		√	
<b>Environmental and other Uses</b>			
Recreational Ponds with Body Contact (Swimming)	√		
Wildlife Habitat/Wetland		√	
Aquaculture	√	√*	
<b>Groundwater Recharge</b>			
Seawater intrusion Barrier	√*		
Replenishment of potable aquifers	√*		

\* Restrictions may apply

**Primary Wastewater Treatment** -The removal of particulate materials from domestic wastewater, usually done by allowing the solid materials to settle as a result of gravity, typically, the first major stage of treatment encountered by domestic wastewater as it enters a treatment facility. The wastewater is allowed to stand in large tanks, termed Clarifiers or Primary Settling Tanks. Primary treatment plants generally remove 25 to 35 percent of the Biological Oxygen Demand (BOD) and 45 to 65 percent of the total suspended matter. The water from which solids have been removed is then subjected to Secondary Wastewater Treatment and possibly Tertiary Wastewater Treatment.

**Secondary Wastewater Treatment** - Treatment (following Primary Wastewater Treatment) involving the biological process of reducing suspended, colloidal, and dissolved organic matter in effluent from primary treatment systems and which generally removes 80 to 95 percent of the Biochemical Oxygen Demand (BOD) and suspended matter. Secondary wastewater treatment may be accomplished by biological or chemical-physical methods. Activated sludge and trickling filters are two of the most common means of secondary treatment. It is accomplished by bringing together waste, bacteria, and oxygen in trickling filters or in the activated sludge process. Disinfection is usually the final stage of secondary treatment.

***Tertiary Wastewater Treatment -***  
*Biological, physical, and chemical treatment processes that follow Secondary Wastewater Treatment. The most common Tertiary Wastewater Treatment process consists of flocculation basins, clarifiers, filters, and disinfection processes. The term Tertiary (Wastewater) Treatment is also used to include Advanced Treatment beyond filters.*



Reverse osmosis is an advanced treatment technology that is used in certain situations where a high degree of pathogens or chemicals must be removed, especially in indirect potable reuse and industrial applications.

California has been a leader in this concept, serving several oil refineries and a seawater barrier with five qualities of water in addition to disinfected tertiary recycled water suitable for landscape irrigation. Customized treatment either at the central wastewater treatment plant or at customer sites is one possibility to add flexibility to add more customers at an acceptable cost.

Treated wastewater is reused in many areas of the State even when no projects have been constructed with this intent. For example, about 90 percent of municipal wastewater discharged in the San Joaquin Valley is reused. A discharge into a river becomes part of the river flow that may be diverted downstream for farms or other cities. This indirect reuse, that is, reuse after treated wastewater has passed through a natural body of water, is illustrated in Figure 3. A groundwater aquifer can also be the natural body for indirect reuse. Recycled water can be injected in wells or percolated from ponds and become a part of the groundwater supply that is later pumped out for use. Water that is retained in streams and wetlands maintains aquatic environments and scenic values. This “environmental water” is another unplanned benefit of indirect reuse of treated wastewater that is discharged into water bodies.

Most indirect reuse is unplanned, that is, there was no prearranged agreement or intention that the producer of the treated wastewater would maintain control of the effluent after discharge so that it would be reused downstream. The downstream reuse is an incidental result of effluent disposal by discharge and withdrawal downstream of river water. When such indirect reuse could occur, the wastewater discharge is regulated to protect the public health for the downstream beneficial use. Planned reuse typically involves direct reuse by delivering recycled water directly through pipes to the users of the water. Examples of direct reuse are also illustrated in Figure 3.

These concepts of direct and indirect reuse and planned and unplanned reuse are important in understanding the discussion of public health issues and public acceptance concerns regarding water recycling. They are also important in interpreting data on water reuse, which are not consistent in indicating whether they include only planned or only direct reuse.

Furthermore, unplanned indirect reuse already makes a vital contribution to the State’s water supply. In terms of making the greatest impact on augmenting the State’s water supply, emphasis should be placed on reusing recycled water that has no opportunity to be reused downstream, for example, discharges directly to the ocean. This understanding may affect the priority of the State’s efforts in encouraging new water recycling projects. In terms of statewide water resources planning, DWR recognizes this distinction by classifying water recycling projects in coastal and some other areas as “new water supplies” because they offset the need for other new supplies rather than offsetting downstream reuse that already may occur.

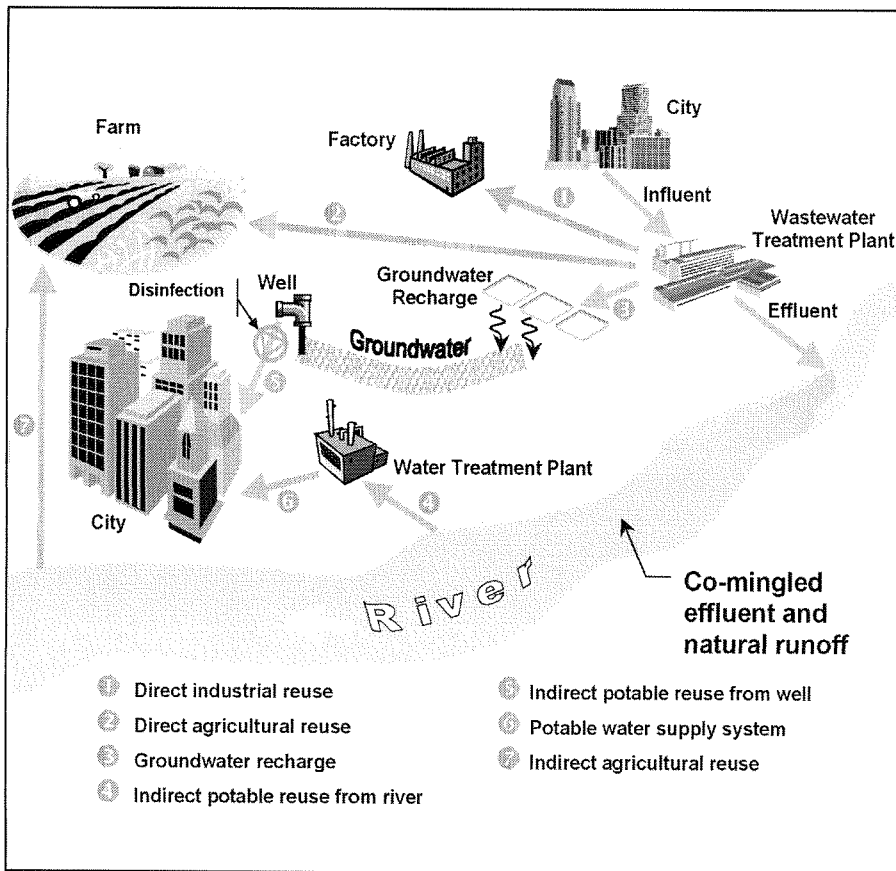


Figure 3. Direct and Indirect Recycled Water Use.

Research surveys conducted to evaluate public acceptance of recycled water have confirmed the intuitive expectation—the more direct and frequent the human contact with the recycled water, the more concern of the public, mainly related to public safety perceptions. While direct human ingestion has been proposed and researched, recycled water even with highly sophisticated treatment technologies has never been publicly accepted for direct potable use in the United States. With few exceptions nonpotable uses, including some uses with high potential for human contact, such as golf courses or schoolyards, have potential for infection or other disease to indiscernible background levels.

While direct potable reuse is not practiced, forms of indirect potable reuse have taken place in California and have been proposed. The Task Force did find a widely divergent acceptance of these indirect potable reuse concepts. Groundwater recharge by replenish-

ing groundwater aquifers with recycled water has been practiced in California since 1962 in the form of percolation from ponds through soil before reaching the groundwater and since the 1970s in the form of direct injection of advanced treated recycled water into aquifers. Because the aquifers serve as a potable water supply through wells, recharge is a form of indirect potable reuse. Various forms of tertiary wastewater treatment are provided before the recycled water is allowed to reach the aquifer. These levels of treatment are higher than would generally be required for discharges to a typical stream or the ocean. There are also natural mechanisms in the soil that provide treatment of any water that percolates down. As with all uses of recycled water, a strong governmental structure regulates the types of treatment necessary to protect public health, and generally the public has accepted the judgment of the public health authorities. However, in some communities public concern has halted the implementation of indirect potable reuse projects. The Task Force focused considerable attention to public acceptance and health issues and made recommendations to address these.

## WATER RECYCLING POTENTIAL

Estimating the future potential of recycled water use is an uncertain task. Water planners will be continually evaluating a variety of alternative water sources to determine the most cost-effective and feasible options at the time. While there are increasing public health concerns not only with respect to recycled water but also with all of our sources of water, technology is becoming more effective to cope with some chemicals of concern. Technology is evolving that will make recycled water treatment, as well as alternative sources, such as desalination, more economical. As with conventional water sources, most of the cheapest opportunities to exploit recycled water have already been undertaken. It is difficult to predict exactly how recycled water will compare with alternative supply options in the long term.

Nevertheless, some studies have been conducted to estimate future potential. The most comprehensive were two regional studies covering the metropolitan areas of the Southern California coastal region and the San Francisco Bay Area. In addition, surveys have been conducted to poll agencies regarding the potential projects within their service areas. Another point of reference is the total amount of municipal wastewater that is produced or projected to occur. The amount of treated municipal wastewater produced currently in California is estimated to be about 5 million acre-feet per year. With recycled water use currently at a level of approximately 500 thousand acre-feet per year, about 10 percent of available treated effluent was reused in planned water recycling projects. California's

Recycled water, river water, and imported water feed the Rio Hondo Spreading Grounds to replenish groundwater in Los Angeles County. This indirect potable reuse has been practiced by the County Sanitation Districts of Los Angeles County since 1962.





current population of 35 million is expected to increase by 3.5 million by 2007 to 38.5 million. By 2030, the population is projected to reach 52 million, a 17 million (50 percent) increase over current population. By 2030, the amount of wastewater available for water recycling projects is estimated to increase to about 6.5 million acre-feet per year.

With these studies and projections of available wastewater as a foundation and the caveats of uncertainty, projections for recycled water use are presented in Table 2 and shown in Figure 4 in the form of ranges. In 2030, the midrange amount of projected increase in recycled water use is about 1.5 million acre-feet per year, which would be about 23 percent of the available municipal wastewater. Because of the special public health concerns that have been raised regarding indirect potable reuse, nonpotable and planned indirect potable uses have been separated in the table. Planned indirect potable uses include groundwater recharge, a portion of seawater intrusion barriers and surface reservoir augmentation for potable supply.

As was discussed earlier, many inland discharges of treated wastewater are indirectly used downstream. Thus, not all of the projected additional recycled water use is considered new water that augments the State's water supply. However, with most of the urban demand occurring in coastal areas where discharges pass through to the ocean or saline bays, it is estimated that 1.2 million acre-feet of new water will be yielded with recycled water use by 2030. When compared to the household use of the additional 17 million Californians, this new water could substitute for enough fresh water to meet the household water demands of 30 to 50 percent of the household water demand.

As with many water supply options facing California to maintain adequate future water supplies, considerable capital investment will be required for water recycling facilities. As with surface water storage, conjunctive use and ocean desalination projects, for example, funds for design and construction of recycled water projects must be raised at the outset of a project even though revenue to pay the debt will become available over many years of project operation.



Serrano's championship golf course is irrigated with recycled water in El Dorado Hills, California.

Table 2. Estimated Existing and Projected Potential Use of Recycled Water in California (taf/year).

<b>Year</b>	<b>2002</b>	<b>2007</b>	<b>2010</b>	<b>2030</b>
<i>Planned non-potable use</i>	400-510	520-740	770-1,000	1,520-1,850
<i>Planned indirect potable use</i>	50-70	80-120	120-170	330-400
<b>Total</b>	<b>450-580</b>	<b>600-860</b>	<b>890-1,170</b>	<b>1,850-2,250</b>
<b>Increase beyond 2002</b>		<b>150-280</b>	<b>440-590</b>	<b>1,400-1,670</b>

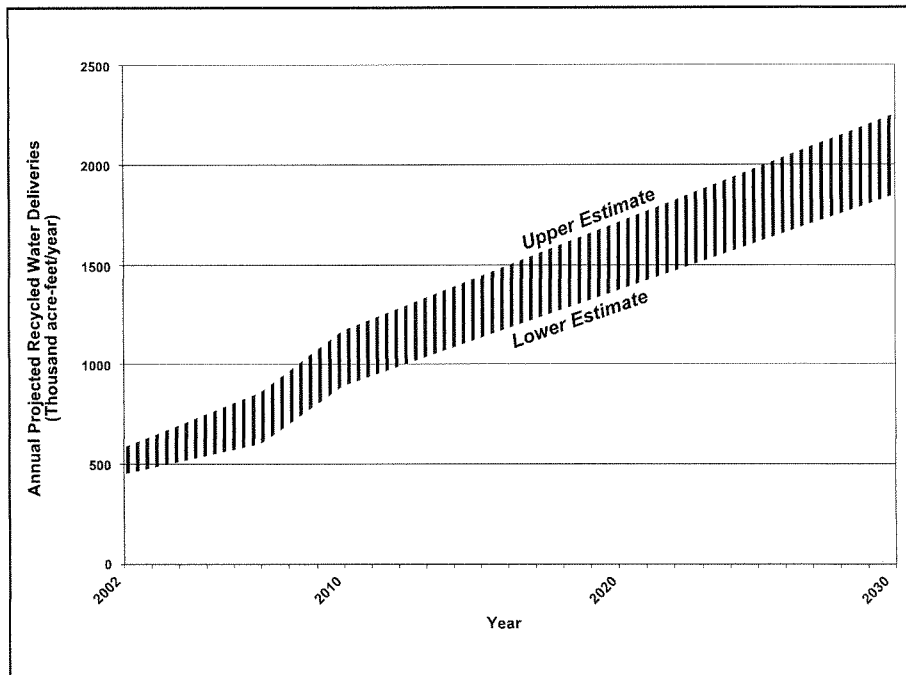


Figure 4. Projection of Recycled Water Deliveries in California through 2030.

A variety of factors can affect costs of recycled water projects, including types of use, the degree of wastewater treatment required, and the distance to deliver the recycled water. The cost to build the capacity to treat and deliver one acre-foot of recycled water annually can vary significantly. When capital costs and other factors are annualized over the life of a project, individual projects can vary from practically no extra cost to treat and deliver recycled water to over \$2,000 per acre-foot of delivered water, including capital and operational costs. It should be noted that average unit costs have been estimated to be about \$600 per acre-foot. These costs are generally comparable to other water supply options, for example, new dams and reservoirs or desalination.

Fortunately, most projects will cost well below the upper limit. Utilizing the studies referred to above, an average cost to build the capacity to yield one acre-foot per year was assumed to be \$6,500 for nonpotable reuse projects and \$6,800 for indirect potable reuse projects. The increased cost for indirect potable reuse may be due to higher levels of treatment and reliability features. Applying these unit costs to the projections in Table 1, the ranges of aggregate capital costs were estimated, as shown in Table 2.

To add 1.40 to 1.67 million acre-feet per year of recycled water by 2030, an estimated capital investment of between \$9 billion to \$11 billion will be required between now and 2030, as shown in Table 3. The cumulative investment over time is shown in Figure 5. A State bond issue, Proposition 50, was passed by voters in 2002, which included funds for water recycling projects. These funds are anticipated to take until 2005 to allocate. The average additional funds that will be needed after 2005 until 2030 are between \$360 to 430 million per year. (Note that all costs are expressed in year 2000 dollars.)

It is important to note that water recycling projects can meet water quality needs by reducing wastewater flows into the environment, increasing water that can be available to endangered species habitat, conserving energy, or achieving other needs or goals. Thus, the investment in water recycling may yield benefits beyond just meeting water supply needs.

Table 3. Total Capital Cost Estimates to Augment Recycled Water Supplies, Million dollars.

<i>Years</i>	<i>2003-2007</i>		<i>2008-2010</i>		<i>2011-2030</i>	
<i>Range</i>	<b>Low</b>	<b>High</b>	<b>Low</b>	<b>High</b>	<b>Low</b>	<b>High</b>
<i>Non-potable use</i>	780	1,495	1,625	1,690	4,875	5,525
<i>Indirect planned potable use</i>	205	344	273	341	1,433	1,570
<i>Cumulative cost beyond 2002</i>	<b>985</b>	<b>1,839</b>	<b>2,883</b>	<b>3,870</b>	<b>9,191</b>	<b>10,965</b>
Note: Calculations based on USBR, Southern California Comprehensive Water Reclamation and Reuse Study, September 2000 draft. (Dollars expressed in year 2000 values)						

Water recycling projects are generally constructed and operated by local agencies. Operation and maintenance costs are incurred after the projects are constructed. These costs also vary widely. One sampling of proposed projects had estimated operation and maintenance costs in the range of \$70 to 490 per acre-foot, with an average of \$300 per acre-foot.

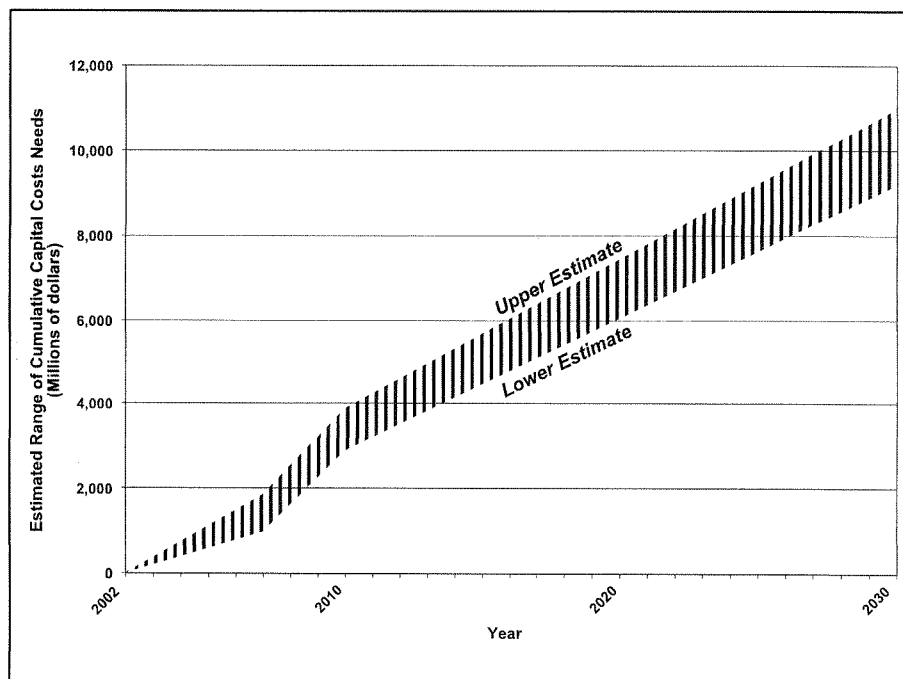
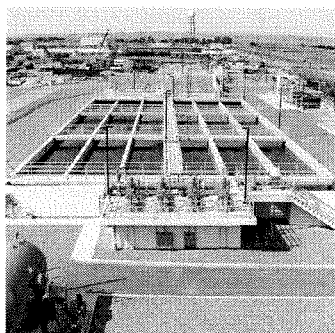


Figure 5. Cumulative Capital Investment in Water Recycling through 2030 in California.



The 12.8 mgd Recycled Water Facility of Delta Diablo Sanitation District treats recycled water for landscape irrigation and for cooling towers at electrical power stations in Pittsburg, CA.

The capital and operation and maintenance costs are recovered mainly through revenues from discharges into sewers, users of recycled water, and potable water customers who share the benefits of the added local supply of water. Freshwater projects are generally self-sustaining, but there is precedent for State or federal subsidy of water projects when particular projects have financial difficulty and there are social, economic, or environmental goals transcending a local project. Because water recycling projects are often more expensive than other local water supplies, the State and federal government have been providing subsidies for capital costs. In addition, some regional water agencies have provided annual subsidies to local agencies based on recycled water deliveries. The State funding has been in the form of low interest loans or partial grants for planning, design, and construction of projects. The sources of these funds have been bond issues, the last of which was Proposition 50 in 2002. The federal funds have been appropriations for partial grants to local agencies for design and construction. The Task Force has recommendations in Chapter 4 regarding additional funding.

**9. 3/3/98-Transcript of Speech by Martha Davis given  
at: UCLA Environment Symposium**

# WATER POLICY

## *Managing the Water Resources of California*

### **Stepping Outside the Box: Water in Southern California**

Speech by Martha Davis  
UCLA Environment Symposium  
March 3, 1998

Nowhere in the West is there a region as obsessed with the possibility of a future water shortage as Southern California. Water is so important to the southland that, as one writer once quipped, "the history of Southern California is the record of its eternal quest for water, and more water, and still more water."

Not that we aren't preoccupied with the issue of future water supplies for a good reason. In the LA Basin alone, we have approximately 6% of California's habitable land but only .06% of the State's stream flow -- yet we hold over 45% of the State's population. And if the population projections are to be believed, the entire southland is "scheduled" to grow from our current 16 million to over 24 million people. When policy questions are asked about whether Southern California can support this level of growth, the issue of greatest concern is not traffic or air quality or even quality of life, it is water. And the predominant question asked is "where will this water come from?"

Our water fears are not new. Since the pueblo days of Los Angeles, the lack of local water resources has been seen as the primary problem for the southland's economic future. All plans for the development of the region have hinged around schemes to secure new water supplies -- a fact recognized by Carey McWilliams, the pre-eminent historian of the southland, who wrote in 1946 that "God never intended Southern California to be anything but desert...Man has made it what it is."

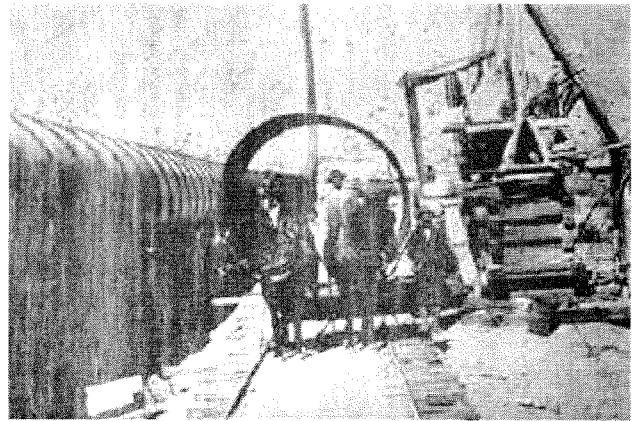


If southern California's fears about adequate water supplies have shaped its own history and landscape, it has also shaped the landscape of water development throughout the State. Los Angeles invented the rhetoric of water development, with its emphasis on scare tactics about drought and future water shortages. LA also conceived the strategy of reaching with aqueducts hundreds of miles beyond local boundaries to bring home new water supplies. Soon water from the Owens Valley and from other distant places would no longer be viewed as belonging to the regions in which it originated; instead the water would be looked upon by the water developers as their "birth right," -- those are the words that Diane Feinstein, when Mayor of the San Francisco, once used to describe that City's Hetch Hetchy Reservoir. At every turn in California's history of water development, Los Angeles and Southern California has led the way.

My purpose today is to talk about how water development in Southern California has profoundly shaped the way we think about our water needs and how those needs can be satisfied -- especially given the dramatic population growth projections for our region. My argument is that the traditional way of thinking about water supplies and needs has created a "box" that we -- indeed the entire State of California -- are stuck in. And, if we do not make an effort to step outside that "box," we are in grave danger of making decisions about our water future that will have two consequences: (1) we will make our region much less able to meet water needs in times of drought and (2) we will needlessly sacrifice important environmental resources in the Sierra Nevada, San Francisco Bay Delta and the Colorado River. In closing, I will make a brief prediction for what I think the future holds.

Let's start by looking at how Southern California developed its water supplies. Originally, Los Angeles had fairly good-sized perennial streams and the first settlements located themselves on their banks. The earliest development of water supplies began in the 1860's with diversions from these streams for irrigation. Next came construction of artesian wells and the development of the region's substantial underground water supplies. But these resources were mined within a single generation through excessive groundwater pumping.

By 1900, the City of Los Angeles was beginning to fear a "future" water famine, based both on real population growth and the dreams of speculators to develop the San Fernando Valley. It was a financial cabal (including Harry Chandler, General Harrison Gray Otis, and Henry Huntington) who conceived in 1905 of the idea that the city of Los Angeles should build a 238 mile aqueduct to tap the waters of the Owens River and bring it to the San Fernando Valley -- an area, at that time, that was not within Los Angeles city limits. To secure the funds to build the aqueduct, a \$25,000,000 bond issue was put on the ballot. The Los Angeles Department of Water and Power, the City's water utility, then created an artificial water famine -- some claim that the City even dumped its water reserves into its sewer system at night. In fact, LA's water supply became so scarce that, on the eve of the election, the city passed an ordinance forbidding people to water their lawns and gardens. Needless to say, the bond passed, but the aqueduct was built only to the edge of the San Fernando Valley where the terminal point still remains, and the water was initially used to irrigate agricultural land outside of the City boundaries, not to provide domestic water to the residents of Los Angeles. At a later date, Los Angeles annexed the San Fernando Valley to ensure that there was no question about the City's right to use the water for all purposes.



The Owens Aqueduct was completed in 1913. Since that water wasn't going to LA residents and the City's population had continued to grow, LA started to search for more water. In 1915, the



Los Angeles Department of Water and Power began work to extend the Owens Valley aqueduct north, and still later, it sponsored the Boulder Dam Act to secure water from the Colorado River, which would require the construction of another aqueduct of 400 miles. In 1928, Los Angeles

conceived and helped to create the Metropolitan Water District of Southern California to help finance the Colorado River project. Today MWD's service area extends from Ventura County to the Mexican border, and MWD remains the largest urban water supplier in the nation. In the 1940s, Los Angeles extended its Owens Aqueduct into the Mono Basin. In the 1950s, Los Angeles supported the construction of the State Water Project which would bring water from Northern California into the Southland, and it began work on yet another expansion of the Owens Aqueduct, ultimately doubling its diversions from this region. So, by the 1970s, the southland was connected by a vast network of Federal, State and local dams and aqueducts to water supplies from Northern California and the Colorado River watersheds.

Unfortunately, most of those dams and aqueducts were constructed with little and often no thought to the environmental or local economic consequences of these projects. The classic example is that of LA and the Owens Valley where a thriving agricultural area was returned to sage brush and Owens Lake was reduced to dust. But where Los Angeles led, others in the State followed. We built dam after dam after dam, shifting water from one place to another and decimating the State's natural fisheries and ecological systems. Development of domestic water supplies was considered the "highest and best use" of water in the state, closely followed by agricultural uses. Environmental needs were not part of the equation.

If the State's first fifty years of water development was about the construction of dams and aqueducts to meet LA's and California's growth needs, the second fifty years has been about coping with the environmental problems created by those projects. It was evident by the 1970's that the State faced serious environmental problems, which by the 1980's would become a crisis for both anadromous fisheries and important ecosystems including the San Francisco Bay Delta and Mono Lake. Litigation forced major changes in water law, including the recognition that water projects must provide sufficient releases for fisheries and ecosystem protection. Additional, legislation adopted in the 1970's and 1980's, including the Endangered Species Act, the Clean Air Act and the Clean Water Act, would soon require modification of water projects to help undo some of the environmental damage they had created.

These developments have set the stage for the "clash of the titans" style water fights that we have witnessed in California over the past two decades. California has continued to grow, and -- in the pattern first set by Los Angeles -- the State agency responsible for planning California's water future, the Department of Water Resources, regularly forecasts draconian water shortages if more dams and aqueducts are not constructed to meet those needs. At the same time, environmental laws are requiring existing water projects to give some water back to the environment. Examples include the Miller-Bradley legislation of 1992, which required 800,000 acre-feet from the federal Central Valley Project to be given back to the Bay-Delta and the recent State decision requiring Los Angeles to raise the level of Mono Lake by substantially reducing its diversions.

So now we can begin to see the outlines of the water box we are in, based on the approach pioneered by the southland to meeting water needs. As we look into the future, we see population and economic growth which will require water. This is projected as a water shortage that must be filled. The water of choice is imported water supplies -- and so we reach out to a water rich area to supplement locally limited supplies. And certainly, if we view ourselves as water short, we will also view ourselves as not being able to give up a single drop of our existing supplies to the environment. Sound familiar?

If the southland has helped to shape the box that the State finds itself in, it has also pioneered the way to step outside of the box. Only a lot of people don't know it yet.



Prior to 1990, conservation and local water recycling programs were talked about in general terms as "good public policy," but rarely was any significant money invested by southland water agencies in the development of these programs. The reason was that imported water supplies was the primary strategy by which Southern California would meet its future needs (back to the box thinking), and the focus was on construction of a new 800,000 acre-foot Eastside Reservoir, completion of the State Water Project and keeping all southland aqueducts full.

But the drought that had started in 1987 suddenly intensified in 1989-1990, forcing water agencies in Southern California to require cutbacks in water use -- and for the first time, water "rationing" (that negative term to describe the use of less water) wasn't just talked about, it was imposed. MWD and other water agencies were genuinely concerned about meeting record levels of demand in the Southland, and so moved to aggressively fund and implement water conservation programs along with the development of local southland water supplies (including improved groundwater management and water recycling).

It worked. The response was dramatic: in 1990, MWD water sales peaked at all time high of 2.6 million acre-feet; by 1993, these sales had plummeted to 1.5 million acre-feet -- a savings of over 1 million acre-feet. To put that number in perspective, the fight over the San Francisco Bay Delta is about returning around 1-2 million acre-feet to this ecosystem. And MWD sales have remained low, climbing last year to just 1.8 million acre-feet -- 800,000 acre-feet below the 1990 level.

The unthinkable has happened: today the MWD service area is using about the same amount of water as it used fifteen years ago despite an almost 30% growth in its population. We have fundamentally changed the water demand curve for the Southland; we are supporting more people with less (not more) water.

The City of Los Angeles' experience mirrors that of MWD. Today, as the result of conservation, the city is using over 100,000 acre-feet less than it did in 1990. The level of water use is the same as it was two decades ago, despite a 30% growth in population and the protection of Mono Lake. Clearly we have options for meeting Southern California's water needs that are not dependent upon securing "more" imported water supplies.

This decrease in demand is important, but what is equally if not more impressive is the reliability of the new locally based water supplies that are coming on line as a result of the post-1990 investments. The problem with an imported water system is that it is highly dependent upon storage capacity to carry over snowmelt in order to withstand a lengthy drought -- such as the 7-year drought we just experienced. When there is little or no snow, there is little runoff. The longer the drought, the more vulnerable the regions that are dependent upon imported water supplies -- and the greater the potential impact on their economies.

In Southern California, many cities responded to the drought by exploring projects that would make them less dependent upon imported water supplies, and improve their capacity to meet their water needs through local water sources they directly controlled. As a result, Department of Water Resources' current water projections (Bulletin 160-98) show that Southern California -- out of all the regions of the State -- is in one of the best positions to meet its future water demand (even with all of the projected growth) because of the water recycling, groundwater recharge and other local management projects that we have been bringing on line over the past five years.

This kind of thinking has tremendous implications for addressing the big environmental issues that the State faces. Take the Mono Lake example. The usual way of thinking about Mono Lake

is that the lake was saved by taking water away from Los Angeles -- thus, increasing the water problem for the Southland and, by extension, for the San Francisco Bay Delta because more water "would have to be imported from there" or from somewhere else to make up the short fall. This is a classic example of the "old" approach to water in California.

Yet the reality is the solution for Mono Lake included the development of new water projects in Los Angeles that not only replaced the water that Los Angeles would no longer divert from the lake, but actually created more new, more reliable and economically valuable water for the city. Keep in mind that the water available to LA from the Mono Lake watershed varies with the snow pack, so that it did little to help the City during drought periods. Further, the development of conservation programs helped LA to address its sewer system problems and protect Santa Monica Bay by reducing pressure on these antiquated pipes. The programs were implemented by a diverse array of Los Angeles community groups who earned money for their efforts and used these funds to re-invest in our community. And, on top of everything, instead of just advising the city on what it "should" do, the Mono Lake Committee helped the city to secure over 80 million dollars in state and federal funds to make sure that these supplies would be developed.

What was done at Mono Lake can be done elsewhere in the State of California. Funds to implement conservation, demand management, water recycling, conjunctive use and improved groundwater management can be used to develop "new" supplies to ensure that more water can be shared with the San Francisco Bay Delta and other environments to protect these resources at the same time that urban and agricultural water needs are met. We can do this.

What is astounding is that most people in the water world don't "know" about the success of Southern California in "stepping outside the box" to develop new solutions in its eternal quest for water. And, more astounding, those who do know aren't talking about it. Sadly, we are seeing a slow down in overall southland funding of conservation programs. Even investments by MWD in local projects are starting to be deferred. The reason? Because "they may not be needed."

And yet, we are now hearing from the California Department of Water Resources in the just-released Bulletin 160-98 that we are, once again, in a water crisis with a water doomsday looming twenty years from now. What is the primary solution offered by the State to close that gap? You guessed it: more imported water storage and conveyance facilities. What about new conservation and other local programs? For the southland, DWR recommends "deferring" many of these projects because Southern California has already reached the State's goals for these programs!!! Hello? Unbelievably, DWR also recommends that most urban and agricultural conservation programs be "deferred" through-out the State.

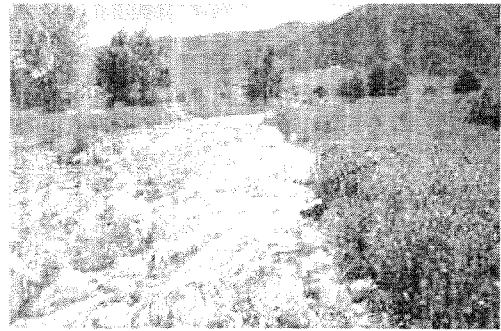
What are the consequences of this "old" way of thinking? First, it can only serve to intensify the current conflict among urban, agricultural and environmental interest groups because it implicitly selects "winners" and "losers" in planning for the State's water future. Second, it will make the State's economy more vulnerable -- not less -- to the impact of lengthy droughts because it encourages every sector of the State to be more dependent on imported water supplies and less dependent on locally controlled water supplies. And finally, it creates the danger of the State building environmentally damaging water projects that become the new stranded asset in California -- because these water supplies will be more expensive and less desirable in the long run than locally-developed water conservation and recycling projects. Already, the financial underpinnings of existing projects like Los Banos Grande off-stream storage are being questioned because the water is viewed by some as "being too expensive." Future dams and other concrete projects are unlikely to be constructed unless the public is willing to provide substantial financial subsidies to underwrite the costs. Here's one prediction that is easy to make: be

prepared to see more water bond measures -- with hefty dollar investments for concrete -- proposed for California's ballot.

The main stage where California's water future is now being played out is in Sacramento, where California and Federal agencies (known as CalFed) are laying out a strategy for "fixing" the San Francisco Bay Delta and meeting the State's future water needs. The first draft of the CalFed plan and environmental impact report is scheduled to be released this month, so we'll see what they have to say. My hope is that CalFed will present a bold, new water strategy for California that is built upon a foundation of aggressive conservation and water recycling programs and that will be given the time to reshape water demand before new concrete is considered. My fear is that we'll see a "business as usual" program, pushing for more concrete, more dams, and larger conveyance facilities long before water conservation and recycling projects are fully implemented.

Make no mistake about it -- we stand at a crossroads in California's water history. We can follow the old path mapped out by the water mavens of Southern California's past -- or we can create a new one, following the steps Southern California briefly illuminated during the deepest days of the drought.

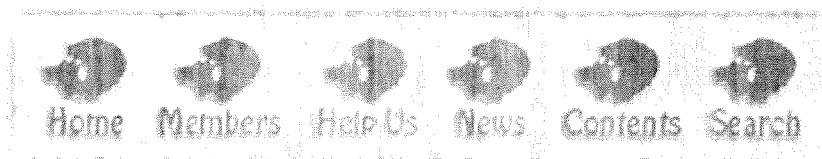
Let me close with a prediction. I am an optimist by nature so, for my part, I predict that we will "step outside of the box" and we will develop aggressive water conservation and recycling programs that will reshape demand in California. And, if we do this, we will meet the needs of our growing urban and agricultural regions at the same time that we return water to the San Francisco Bay Delta, restore the San Joaquin River, witness the recovery of salmon populations in our lifetime and -- ultimately -- have the water we need to secure the economic and environmental future we want for California.



Thank you.



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(how to contact us)